

Flooding and Drinking Water

State Water Resources Control Board

Division of Drinking Water

for SWEPC

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State Water Resources Control Board

Division of Drinking Water

Objectives - Awareness

- SWRCB DDW
- PWS – types, sizes, numbers
- Understanding of drinking water – source, treatment, distribution, storage, use
- Vulnerabilities
- DDW Duty Officer
- Public Notifications
 - BWN/DND/DNU
- EWQSK
- Coordination with Partners and Stakeholders
- Case – flooding/mudslide
- Questions



State of California State Water Resources Control Board DIVISION OF DRINKING WATER DISTRICT OFFICES

Headquarters Office
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Governor

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Region II - Stefan Cajina (Richmond)
FC - Maria Pang (916) 445-2493

Southern California FOB Kurt Souza - Acting

Region III - Carl Carlucci (Fresno)
FC - Joel Greathouse (559) 447-3481

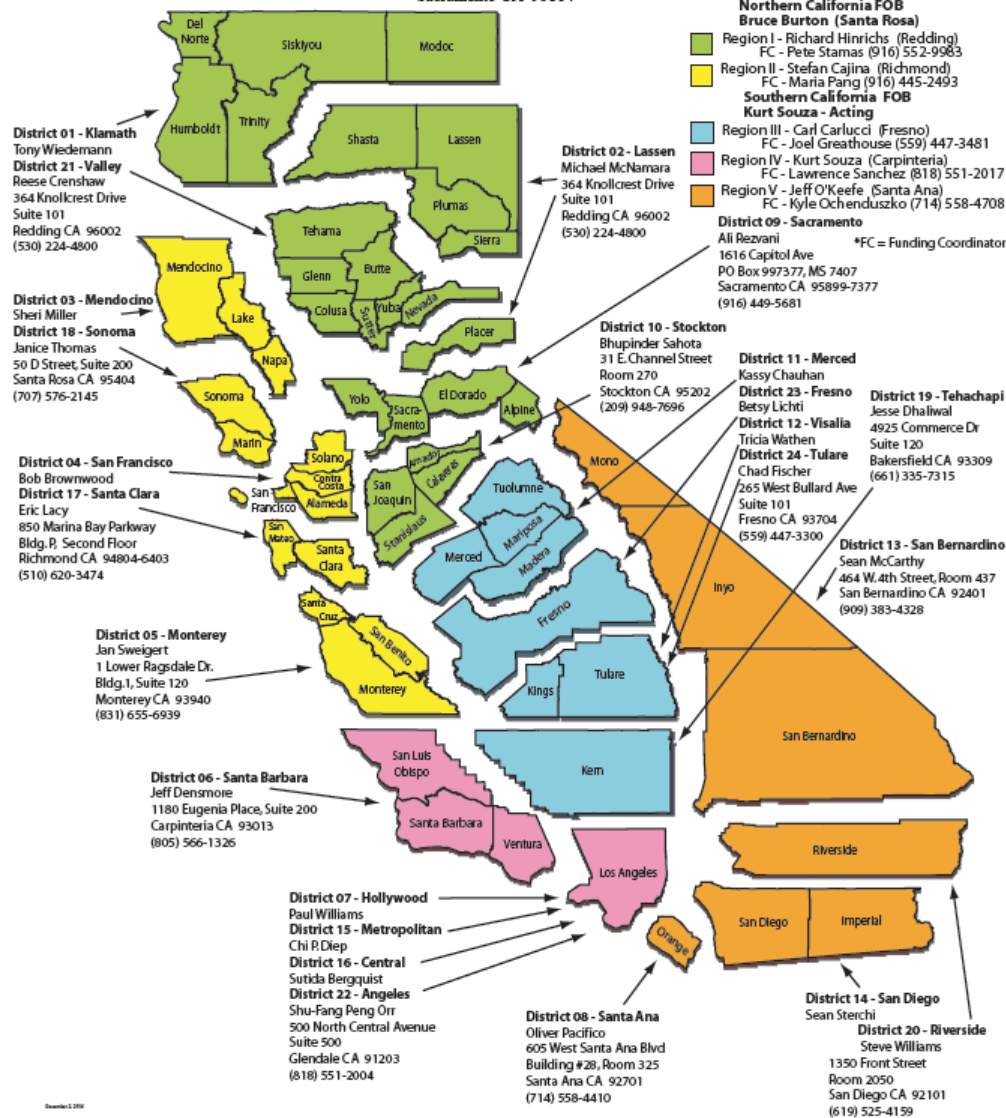
Region IV - Kurt Souza (Carpinteria)
FC - Lawrence Sanchez (818) 551-2017

Region V - Jeff O'Keefe (Santa Ana)
FC - Kyle Ochenduszko (714) 558-4708

District 09 - Sacramento

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*FC = Funding Coordinator



WHO ARE WE?

We are distributed
throughout the State

We also have greater
numbers where population is
greater

We can call on resources not
affected by an event



Assure safe, clean, wholesome and potable water is served reliably and adequately.

- Regulating public water systems – compliance with Maximum Contaminant Levels (MCLs) – jurisdictional responsibility
- Conduct inspections, issue permits, and implement enforcement proceedings where necessary
- Educate and train – new regulations
- Respond to emergencies and coordinate with partners; help identify and solve challenges

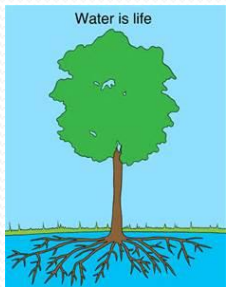
IT'S WHAT WE DO



So much meaning in $H+H+O$ (H_2O)

- Purity
- Cleanliness
- Power
- Health
- Fun and recreation
- Life
- Wealth
- Fish
- Baby formula

- Electricity
- Cooling
- Jobs
- Cutting
- Industry
- Disaster
- Food
- Baptism
- Diet

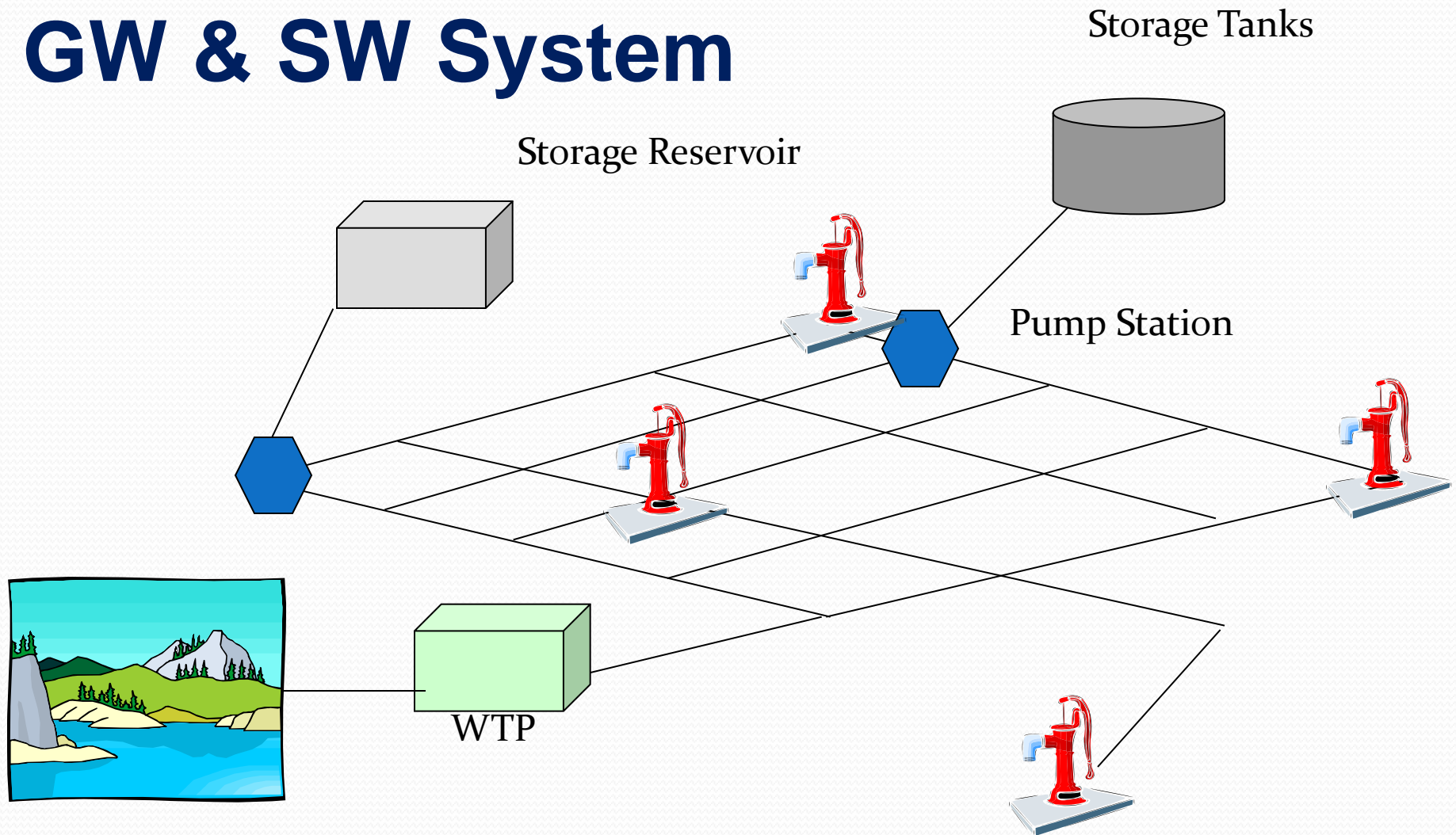




Water is Critical

The Water Sector is one of the
16 Critical Infrastructures
recognized by DHS - assets
that are essential for the
functioning of a society and
economy

GW & SW System



Public Water System (PWS)

- Serves 25 or more people at least 60 days of the year.
- Meet At Least One of the Following:
 - Have Its Own Source
 - Treats the Water
 - Sells the Water

PWS Types

- Community Water System (CWS)
 - Serves 15 or More Service Connections Used by Yearlong Residents
 - Or Serves 25 Yearlong Residents
- Noncommunity Water System
 - Nontransient-Noncommunity (NTNC)
 - Transient Noncommunity (TNC)

PWS Examples

- CWS
 - EBMUD
 - City of Long Beach
 - LADWP
 - SFPUC (Regional Wholesaler)
 - Serves Water to Other CWS That In Turn Sell It Directly to Customers
 - SFPUC Serves Over 30 Retail CWS
 - MWD

PWS Examples

- NTNC
 - Schools
 - Places of Employment
 - Factories
 - Office Buildings
- TNC
 - Rest Stops
 - Parks
 - Restaurants

Numbers of PWS

- Total PWS in CA ~ 8000
- CWS ~ 3200
 - >3300 Service Connections ~ 400
 - 1000 to 3300 ~ 300
 - 200 to 999 ~ 400
 - 15 to 199 ~ 2000
- NTNC ~ 1500
- TNC ~ 3000

Public Water System Sources

- Groundwater (16,000)
 - Wells
 - Springs
- Surface Water (1,000)
 - Lakes/Reservoirs
 - Rivers
 - Canals

Surface Water Source



Lake Casitas Dam face (to the right). Intake to water treatment plant also to the right (sloped intake with 9 gates). Reservoir holds 250,000 Af, Earth fill dam.



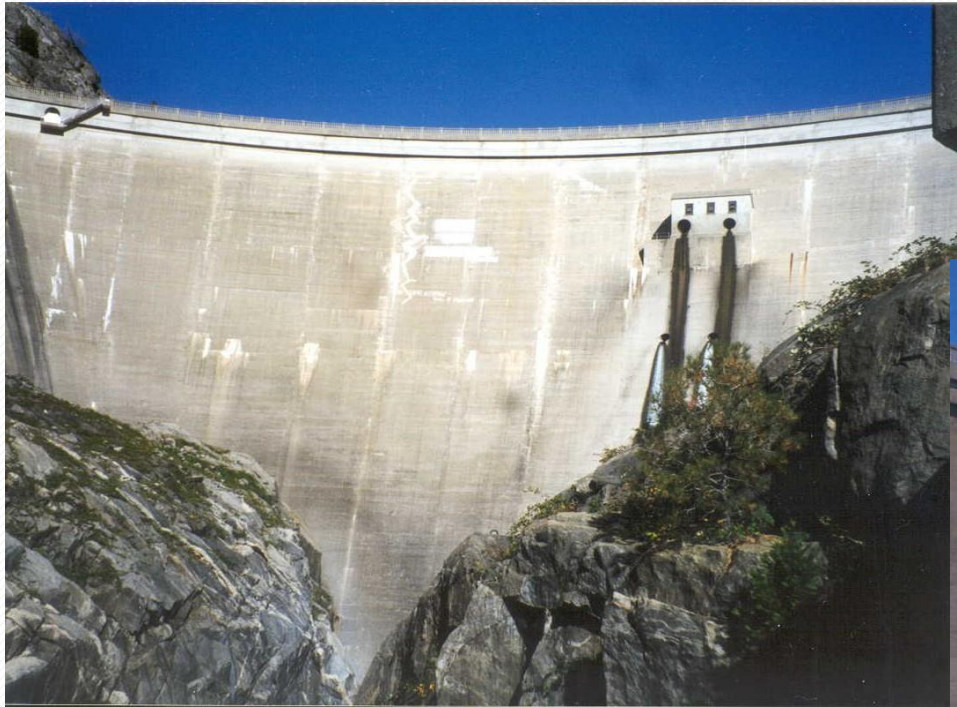
Intake structure

Lake Casitas dam face. Sloped intake with 9 gates each with 22 ft. vertical separation. Gate selection for source water based on turbidity, DO, and temp. Typically water is drawn off from below the thermocline, but above the aeration devices.

Hetch Hetchy Reservoir



Dams



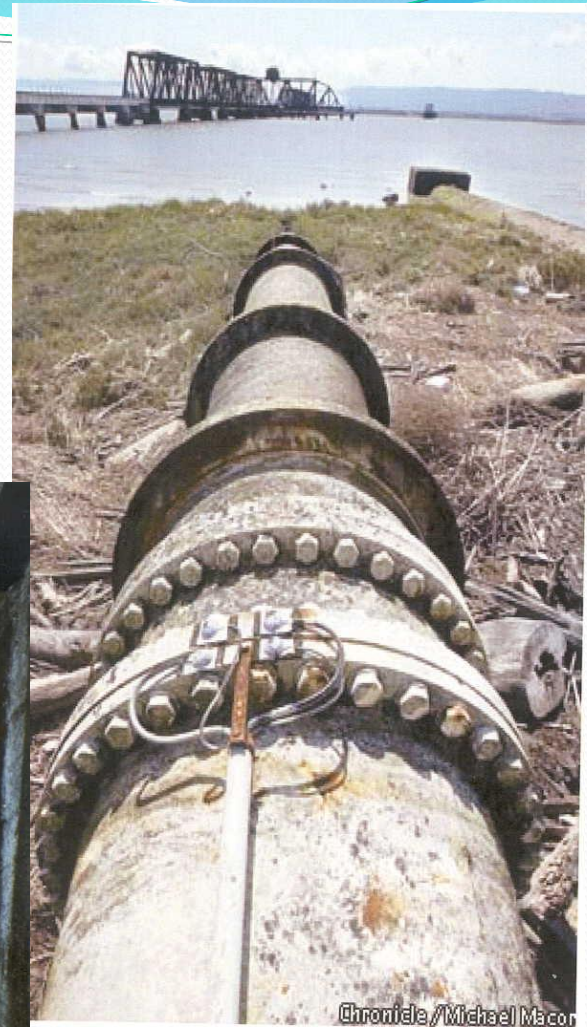
Intakes



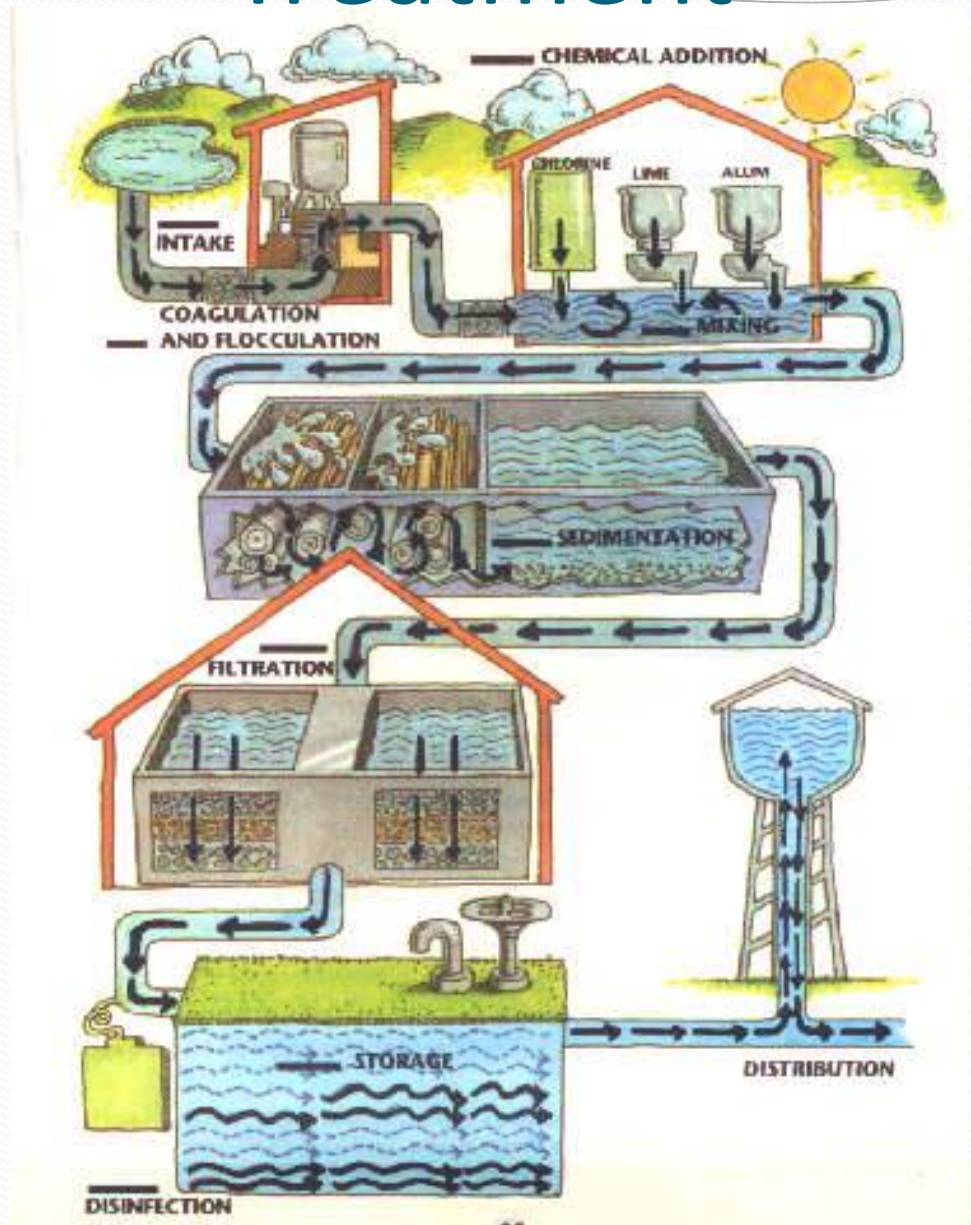
Canals



Aqueducts

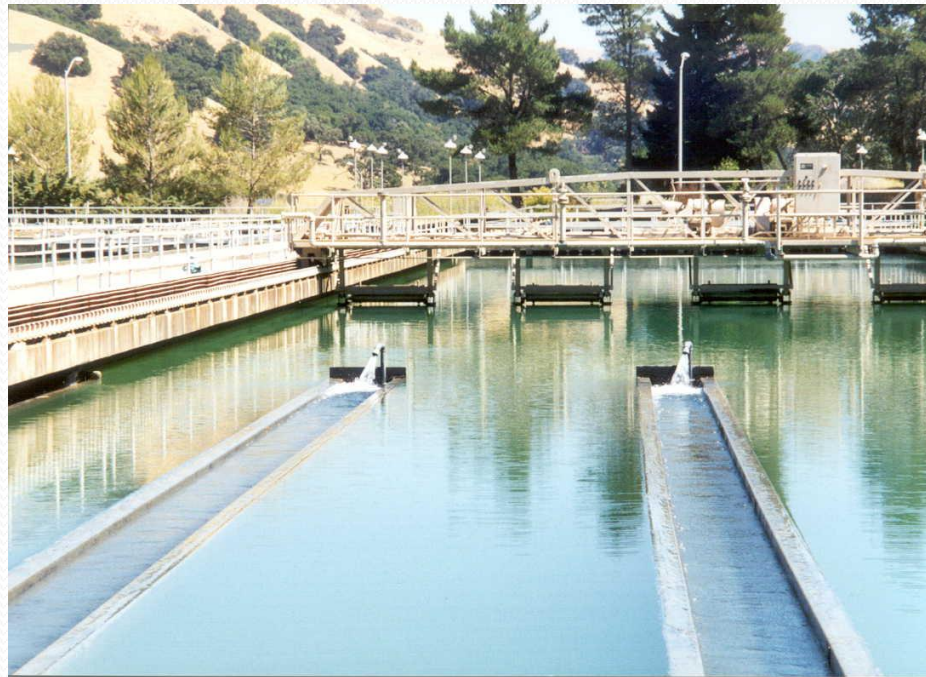


Treatment



Water Treatment Plants

- Key Points in a PWS
- Main Barrier Between Untreated Water and Drinking Water



Water Treatment Plants

- Has Hazardous Chemicals Onsite
 - Gas Chlorine
 - LOX
 - Water Treatment Chemicals, Acids/Bases



Harry Tracy WTP - LOX



Raw water coagulant feed building and chemical storage tanks.





Well Source



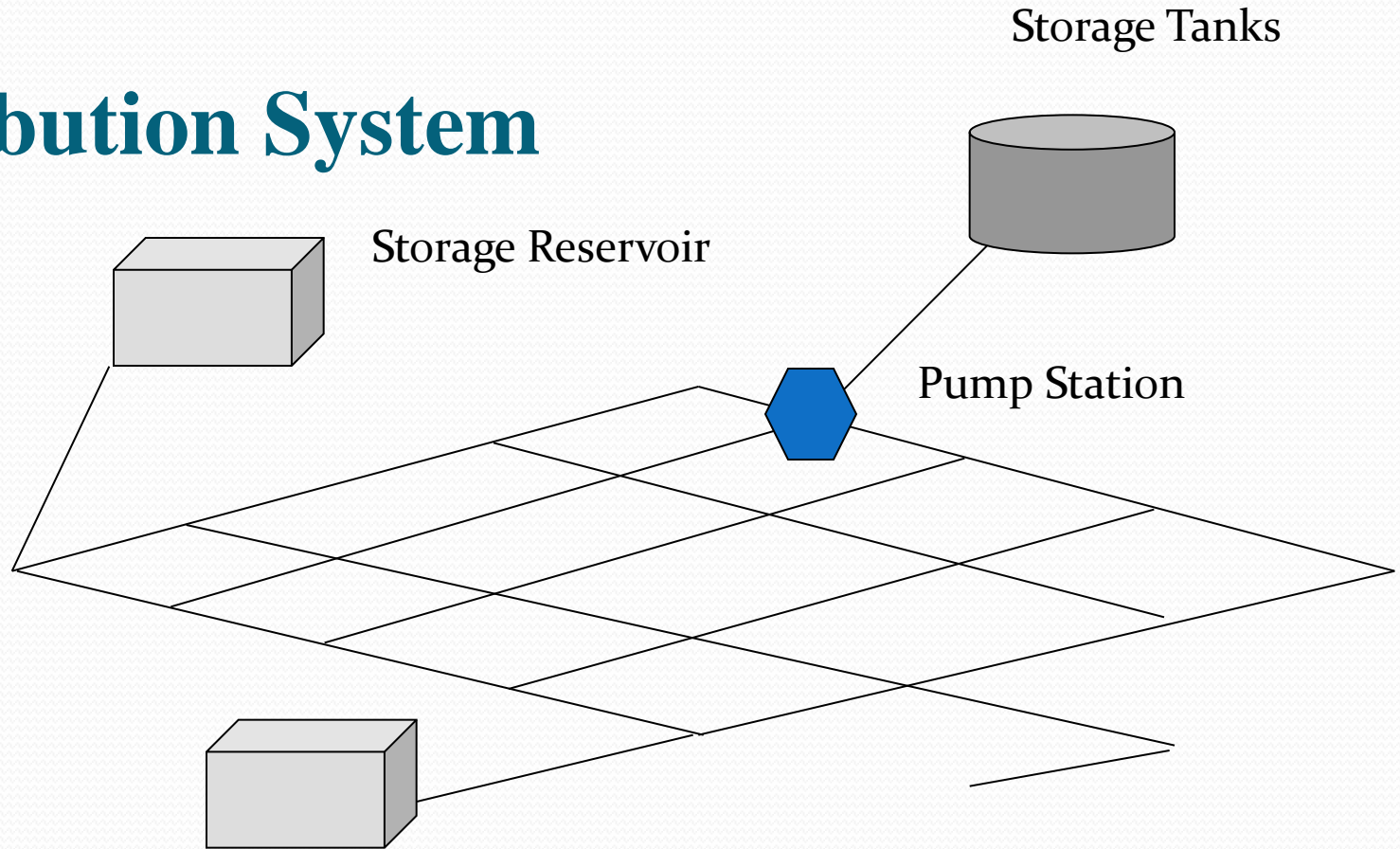
Well Sources



Groundwater Wells

- >16,000 In CA
- Many Have Limited Protection
- Many Wells are Untreated
- Contamination of Well Sources is Possible,
 - An Individual Well Does Not Serve A Single Large Population, But Many Wells Do
 - Contamination of One Well will Only Contaminate a Limited Area of a Water System
 - Contamination of the Only Well of a SWS is a Problem!

Distribution System



- Chlorine residual
- Service pressure
- Monitoring – Sampling - Analysis

Tanks/Reservoirs

- Numerous
- Many in Isolated Areas
- Limited Service Areas

Storage Tanks



Storage Tanks/Reservoirs

Concrete Reservoir



Redwood Tanks

Covered Reservoir



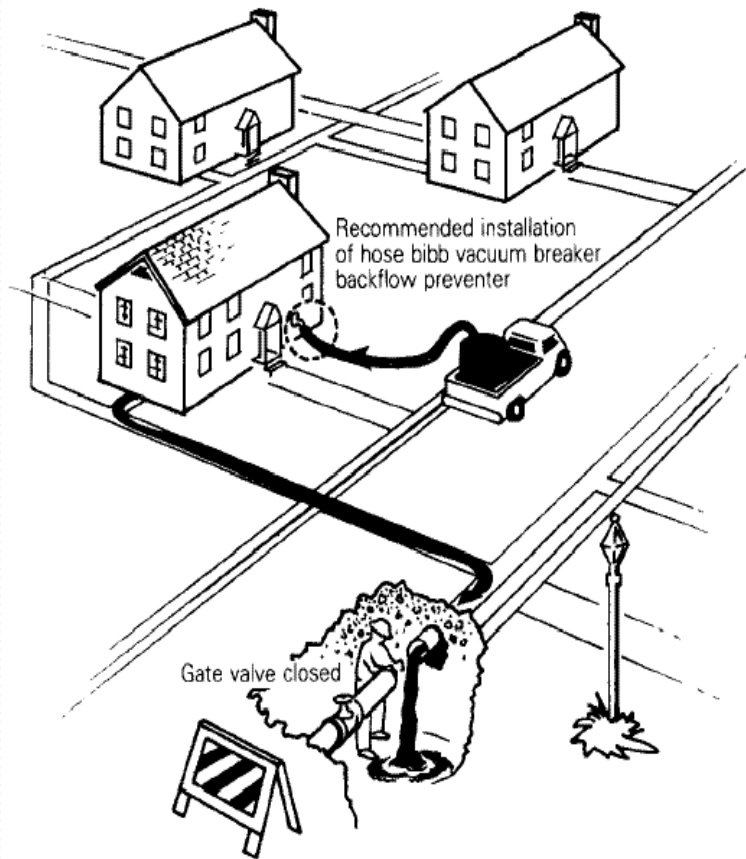
Tanks/Reservoirs



Pumping Stations



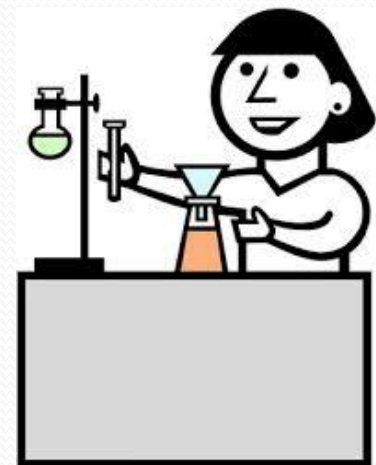
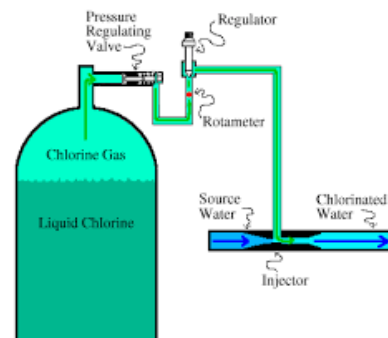
Service Connections



Backflow and Cross Connections

Activities to bring you that water

- Pumping and moving
- Sampling and analysis
- Treatment
- Monitoring and compliance
- Information and data analysis and interpretation
- Information dissemination, outreach, and education
- Emergency response, trouble-shooting
- Operations and maintenance
- Research and development
- Infrastructure replacement
- Forecasting
- Preparedness
- Security



Water Concerns

- Aging water and wastewater infrastructure
- Growth - increased demand of limited resources
- Frequency of natural disasters
- Disaster damage
- Terrorism threats
- Drought- snowpack, surface water
- Operations and maintenance
- Contamination – pre and post war (Superfund sites)



Threats and Hazards - Natural



- Earthquake
- Flood
- Pandemic Outbreak
- Space Weather
- Tsunami
- Wildfire
- High Winds



- Land Slides
- Debris Flows
- Drought
- Atmospheric Temperatures
- Tree Roots
- Excessive loading



This view, taken the morning of the earthquake, looks west across Balboa Blvd. A zone of extensional ground failure runs approximately from the upper left to the lower right corners of the photograph. Ground failures ruptured two major water lines and two gas lines beneath the street. Several minutes after the earthquake, a spark from the pickup truck (center) ignited leaking natural gas, and produced a fireball that burned five houses to the ground and seriously damaged a sixth.



Threats and Hazards – Technological/Accidental

- Chemical Substance Spill or Release
- Over/under feed of treatment chemicals
- Power failure/accident
- Failure of Interdependencies (partners)
- Mechanical failures (pumps, boosters, sensors, SCADA)
- Infrastructure degradation
- Insufficient design
- Dam/Levee Failure
- Haz Mat Release
- Failure on standards/operation



[Supervisory Control And Data Acquisition]



Threats and Hazards – Adversarial/Human Caused



- Chemical/Biological Contamination Terrorism Attack
- Armed Assault
- Cyber Attack Against Data/Control
- Cyber Attack Against Physical Infrastructure
- Explosive Terrorism Attack
- Vandalism
- Metal Theft



Also Threats/Hazards due to
Dependency/Proximity



Interdependencies

- Water for cooling in energy and industrial production
- Energy for drawing, moving, and treating water
- Water for hydro-electric generation
- Water to maintain sterile medical conditions
- Clean medical conditions to care for operators and others



Water In Emergencies



Conducting Assessments

- Extent of physical damage
- Power outage / pressure loss
- Need for Unsafe Water Notice
- Water sampling
- Take pictures
- Contact operator
- Prioritize assistance









Soft Drink and Beer Bottling
Plants May Provide
Canned Drinking Water



WALKER'S WATER



Hauled Drinking Water

- Water haulers regulated by CDPH FDB
- Tanks must be food grade
- 0.3 mg/L chlorine residual minimum
- Large private water systems
 - Source of water (treatment plant vs. hydrants)
 - Manifests showing source, disinfection test results
 - Re-chlorination may be needed before use

Approved Tanker



Water Advisories/Notices

- Increase with emergencies
- Can impact multiple jurisdictions
- Issuance – Utility, SWRCB, County Health, State Health
- Contact the Primacy Agency
- Level of advisories
 - Tier 1 Violation – notify within 24 hours, serious and immediate risk to human health
 - Tier 2 Violation – notify within 30 days, adverse effects but no immediate health risk
 - Tier 3 Violation – notify yearly, no direct impact on human health



Unsafe Water Notices

Boil water – Tap water is unsafe for drinking without being treated first. Use bottled water or follow instructions to boil or disinfect tap water.

Do not drink – Tap water is unsafe for drinking, but can be used for cleaning and bathing. Seek another source, such as bottled water for drinking.

Do not use – Tap water is unsafe for any use; seek another source of water such as bottled water.

Boil Water Notice

Boil Water Notice

- Standard template
- Rolling boil for one minute*
- Or chemical disinfection
- Issued by utility or regulatory agency
- Rescinded by regulatory agency
- Translated in other languages

**In cases of high elevation boiling time will need to be increased*



What To Expect During A Boil Water Notice

- Consider sensitive populations such as hospitals, schools, and daycare centers
- Most food facilities will close after being informed that they must, but not all....



Do Not Drink

Unsafe Water Notice

Do Not Drink

- Standard template and language
- Acute contaminants
- Use alternate sources
- Can use water for other purposes other than drinking or food prep



Do Not Use

Unsafe Water Notice – Do Not Use

- Not to be used at all for any purpose
- System depressurization
 - Cross connection concerns
- Unknown chemical contaminants
- Or presence of known contaminants

Lifting a Water Notice



Unsafe water notices can be lifted after water has been tested and found to be safe and SWRCB or LPA has OK'd the system to do so.

Emergency Water Quality Sampling Kit (EWQSK)

- Maintained by SWRCB DDW
- For testing of contaminants introduced to a drinking water system (terrorism).
- Hazmat personnel can use the kit
- SWRCB DDW provides training on the purpose, capabilities and use of the EWQSK.
- Located at SWRCB DDW district offices
- Understand responsibilities in response



Tools



- **VSAT Version 6** – Vulnerability Self Assessment Tool



- **WHEAT** – Water Health and Economic Analysis Tool



- **CBWR** – Community-Based Water Resiliency Electronic Tool (CBWR)



- **Fed FUNDS** – Federal Funding for Utilities - Water/Wastewater - in National Disasters



- **CREAT** – Climate Resilience Evaluation and Assessment Tool



- **TTX** – Tabletop Exercise Tool for Water Systems: Emergency Preparedness, Response, and Climate Resiliency



- **WCIT** – Water Contaminant Information Tool



- **EWQSK** – Emergency Water Quality Sampling



- **CERC** – Crisis and Emergency Risk Communication

- **IAP** – Incident Action Planning

- **Cyber** – US-CERT (United States Computer Emergency Readiness Team) and ICS-CERT – (Industrial Control Systems Cyber Emergency Response Team)

US-CERT



- **ERP** – Emergency Response Plan

- **VA** – Vulnerability Assessment



INDUSTRIAL CONTROL SYSTEMS
CYBER EMERGENCY RESPONSE TEAM

Communication/Coordination/ Cooperation/Collaboration



- **CalWARN** – California Water/Wastewater Agency Response Network

- **INFRAGARD** – Infrastructure Guardian

- **TEWG** – Terrorism Early Warning Group

- **JRIC** – Joint Regional Intelligence Center



- **Local Network**

- **Customer and Customer Organizations**

- **Partners (e.g., Water Systems, Law, Fire, Health, Water)**

- **Suppliers**

- **WLA** – Water Laboratory Alliance

- **CAMAL Net** – California Mutual Assistance/Aid Laboratory Network



- **NIMS** – (National Incident Management System), **SEMS**

(Standardized Emergency Management System), **ICS** (Incident Command System)

- **FEMA** (Federal Emergency Management Agency) **IS** (Independent Studies)



- **UASI/Super UASI** – (Urban Area Security Initiative)



- **LEPC** – Local Emergency Planning Committee

- **Community/Customers**

- **SDLECC** – San Diego Law Enforcement Coordinating Center



- **CMIA** – California Metal Investigators Association

- **EMS** – Emergency Management Services

- **LAFEB CWG** – Continuity Workgroup



Guidance

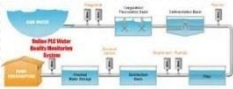


Pacific Southwest/Region 9

- USEPA Webpages -
<http://water.epa.gov/infrastructure/watersecurity/>
<http://water.epa.gov/infrastructure/watersecurity/emmerplan/index.cfm#pp2>
- SWRCB DDW Webpages -
http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Security.shtml
- AWWA resources - <http://www.awwa.org/> and <http://ca-nv-awwa.org/canv/>
- FEMA/DHS Courses
- ERP Guidance
- CERC Guidance
- CDC Guidance



Activities



- Exercise – Training, Seminars, Workshops, Drills, TTX, Functional, Full Scale
- Review and update people, policies, plans, and procedures
- Know your monitoring systems and understand characteristics
- Understand the age of pipes/tanks and the ramifications of such infrastructure aging
- Flushing scheduled
- What if scenarios
- Engage your customers (water watch), know the critical customers (hospitals, dialysis, medical care, food, etc.)
- Understand the treatment processes and nuances
- Understand the flow of the distribution system and the sources involved
- Know where the valves are and exercise them to ascertain that they function well



Mudslide 10/16 – 11/10

11/13/2015

Antelope Valley-East Kern Water Agency - Google Maps



Antelope Valley-East Kern Water Agency

SWP Aqueduct to the AVEK Quartz Hill Plant



Imagery ©2015 Google, Map data ©2015 Google 2000 ft

Mudslide 10/16 – 11/10

11/13/2015

Antelope Valley-East Kern Water Agency - Google Maps

Google Maps

Antelope Valley-East Kern Water Agency

Quartz Hill Plant



Imagery ©2015 Google, Map data ©2015 Google 500 ft

Mudslide 10/16 – 11/10



Mudslide 10/16 – 11/10



Intake is directly from the aqueduct.

Mudslide 10/16 – 11/10

- California Water Service Co. – Leona Valley
- El Dorado Mutual Water Co.
- Lake Elizabeth Mutual Water Co.
- Landale Mutual Water Company
- Los Angeles County WW Dist 37 – Acton
- Los Angeles County WW Dist 4 and 34 – Lancaster
- Los Angeles County WW Dist 40 Reg 38 Lake LA
- Los Angeles County WW Dist 40 Reg 24, 27, 33 – Pearblossom
- Palm Ranch Irrigation District
- Quartz Hill Water District
- Shadow Acres Mutual Water Company
- Sunnyside Farms Mutual Water Company
- Westside Park Mutual Water Company
- White Fence Farms Mutual Water Company
- White Fence Farms MWC No. 3

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Considerations

- Closer coordination and information exchange
- Interconnections and alternative sources
- Conservation and participation
- Notifications
- Emergency Drinking Water Procurement & Distribution Planning Guidance May 2014
- Hauled water, bottled water (CDPH FDB)
- Users – variety (inc. possibly dialysis and cottage food)

What we went over

- SWRCB DDW
- PWS – types, sizes, numbers
- Understanding of drinking water – source, treatment, distribution, storage, use
- Vulnerabilities
- DDW Duty Officer
- Public Notifications
 - BWN/DND/DNU
- EWQSK
- Coordination with Partners and Stakeholders
- Case – flooding/mudslide



Questions or Discussion

With materials used
from CDC, EPA,
CDPH, others

